

CLAIMS

1. A method for controllably clamping an end of one hollow member to an end of a second
2 hollow member, the members having substantially identical interior surfaces at each end, each
interior including a clamping surface extending from the interior surface, the method comprising:
4 placing, at the abutted ends of said members, a split ring having a closed state where the
ends of said ring are adjacent and the outside diameter of said split ring is less than the minimum
6 inside diameter of said members at their ends, the split ring having a V-shaped rim with two
spaced projecting surfaces;
8 separating the ends of the split ring until the rim engages the inside of said hollow
members with one spaced projecting surface in contact with the clamping surface of one member
10 and the other spaced projecting surface in contact with the clamping surface of the other member.
2. The method of claim 1 wherein the split ring is relaxed in the closed state and is
elastically deformed when the ends are separated, and further comprising providing a spreader to
keep the ends separated.
3. The method of claim 2 further comprising controllably removing the spreader, wherein
the ring returns to the closed state and the members are no longer clamped together.
4. The method of claim 2 further comprising controllably destroying the spreader, thereby
permitting the ring to return to the closed state so the members are no longer clamped together.
5. The method of claim 4 further comprising explosively destroying the spreader.

6. The method of claim 5 wherein said step of explosively destroying the spreader comprises detonating a linear shaped charge adjacent the spreader.
7. The method of claim 6 wherein the spreader has a pair of parallel spaced legs that engage holes in each end of the ring, and the step of explosively destroying the spreader further comprises severing each leg with a linear shaped charge adjacent the leg.
8. The method of claim 4 further comprising mechanically destroying the spreader.
9. The method of claim 8 wherein the spreader has a pair of parallel spaced legs that engage holes in each end of the ring, and the step of mechanically destroying the spreader further comprises severing each leg with an explosively actuated bolt cutter adjacent the leg.
10. An internal V-clamp for holding two abutting hollow members with substantially
2 identical inside dimensions in an end-to-end relationship, each member having a clamping surface extending from an interior surface adjacent the abutted end, said clamp comprising:
 - 4 a split ring having a relaxed closed state where the ends of said ring are adjacent and the outside diameter of said split ring is less than the minimum inside diameter of said members at
 - 6 their ends, said split ring having a V-shaped rim with two spaced projecting surfaces;
 - a spreader for holding said split ring in an elastically stretched position such that said ring
 - 8 rim is pressed tightly against the interior surfaces of said members with one projecting surface being in contact with the clamping surface of one member and the other projecting surface being
 - 10 in contact with the clamping surface of the other member.

11. The internal V-clamp of claim 10 wherein each end of said split ring has a hole, the holes
2 in each end being parallel, and said spreader comprises:
a spreader body; and
4 a pair of parallel legs sized to fit in the split ring holes and extending from said spreader
body, said legs being spaced apart a distance equal to the distance between said split ring holes
6 when said ring is in the stretched position.
12. The internal V-clamp of claim 11 wherein each spreader leg further comprises a set screw
in a transverse hole through the leg, wherein said set screw may be tightened against the ring to
increase the force of the ring against the clamping surfaces.
13. The internal V-clamp of claim 11 further comprising a controllable leg-cutter for cutting
each spreader.
14. The internal V-clamp of claim 13 wherein said leg-cutter comprises a linear shaped
charge extending across said leg at a location between said ring and said spreader body.
15. The internal V-clamp of claim 14 further comprising a slit through a portion of said leg
adjacent said linear-shaped charge, said slit being in compression when said spreader is engaged
with said ring.
16. The internal V-clamp of claim 13 wherein said leg-cutter is affixed to said second
member.
17. The internal V-clamp of claim 10 wherein said clamping surface is on a flange of said
hollow member.
18. The internal V-clamp of claim 10 wherein said clamping surface is on a groove in said
interior surface of said hollow member.

19. The internal V-clamp of claim 18 further comprising a shoulder affixed to said second member that is parallel to and spaced from an inside surface of said ring, said shoulder keeping said ring centered in the members after said ring is in its relaxed state